

We claim:

- 5     1.     An interspinous implant for insertion into an interspinous space between adjacent spinous processes, comprising:
- a) a central body having an upper surface for bearing against an upper spinous process, a lower surface for bearing against a lower spinous process, and first and second side portions,
- 10          b) a first upper extension extending upward from the first side portions,
- c) a second upper extension extending upward from the second side portion, the upper extensions collectively defining an upper bracket, and
- d) a first lower extension extending downward from the first side portion,
- e) a second lower extension extending downward from the second side
- 15          portion, the lower extensions collectively defining a lower bracket,
- wherein each of the second upper and second lower extensions comprises a shape memory metal.
- 20     2.     The implant of claim 1 wherein the implant is a unitary body.
3.     The implant of claim 1 wherein the first upper and first lower extensions are adapted to superelastically extend sideways in a martensitic phase.
4.     The implant of claim 3 wherein at least one of the first upper and first lower extensions has a chamfered end.
- 25     5.     The implant of claim 3 wherein the upper and lower surfaces of the central body define a body height  $H_{CB}$ , wherein each of the first and second lower extensions have an end defining an extension height therebetween  $H_E$ , and wherein the extension height  $H_E$  is less than the central body height  $H_{CB}$ .
6.     The implant of claim 3 wherein the first upper and first lower extensions are
- 30          adapted to extend upwards and downwards in an austenitic phase.

7. The implant of claim 3 wherein the upper and lower surfaces of the central body have an anterior-posterior groove adapted to cradle the spinous processes.
8. The implant of claim 3 wherein the upper and lower surfaces of the central body are parallel.
- 5 9. The implant of claim 3 wherein the upper and lower surfaces of the central body are angled.
10. An interspinous implant for insertion into an interspinous space between adjacent spinous processes, comprising:
- 10 a) a central body having an upper surface for bearing against an upper spinous process, a lower surface for bearing against a lower spinous process, and first and second side surfaces,
- b) an upper pair of extensions extending upward from the central body and collectively defining an upper bracket, and
- 15 c) a lower pair of extensions extending downward from the central body and collectively defining a lower bracket,
- wherein the implant is a unitary body.
11. An interspinous implant for insertion into an interspinous space between a first and second spinous process, the first spinous process having a first and second side, the implant comprising:
- 20 a) a first base having a side surface adapted for fixation to a first side of the first spinous process,
- b) a second base having a side surface adapted for fixation to a second side of the first spinous process,
- 25 c) a first flexible ligament having a first end connected to the first base and a second end connected to the second base.
12. The implant of claim 11 wherein each of the first and second bases comprises an upper surface, and the first end of the first flexible ligament is connected to the upper
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surface of the first base, and the second end of the first flexible ligament is connected to the upper surface of the second base..

13. The implant of claim 12 wherein the upper surfaces of each base form an angle of no  
5 more than 180 degrees.

14. The implant of claim 12 wherein the upper surfaces of each base form an angle of less than 180 degrees.

10 15. The implant of claim 12 wherein the upper surfaces of each base form an angle of between 100 degrees and less than 180 degrees.

16. The implant of claim 11 further comprising:

15 d) a second flexible ligament having a first end connected to the first base and a second end connected to the second base.

17. The implant of claim 11 wherein each base comprises a transverse through hole passing through the side surface adapted for fixation to a side of a spinous process.

20 18. The implant of claim 11 wherein the first ligament is made of a flexible polymer.

19. The implant of claim 18 wherein the flexible polymer is selected from the group consisting of ultra high molecular weight polyethylene and PEEK.

25 20. The implant of claim 19 wherein the flexible polymer is polyethylene.

21. An interspinous implant for insertion into an interspinous space between a first and second spinous process, the implant comprising:

30 a) a central body having:

i. an upper surface for bearing against an upper spinous process,

ii. a lower surface for bearing against a lower spinous process,  
iii. first and second side surfaces, and  
iv. first and second axial through-holes, each through-hole extending  
from the upper surface to the lower surface,

5           b) a first extension having an upper end and a lower end, the first extension  
extending through the first axial through-hole of the central body,  
c) a second extension having an upper end and a lower end, the second  
extension extending through the second axial through-hole of the central  
body,

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wherein the upper ends of the extensions collectively define an upper bracket, and  
wherein the lower ends of the extensions collectively define a lower bracket.

22. The central body of claim 21 wherein the central body has a sagittal profile  
15 comprising a substantially parallel anterior portion and an inwardly tapering posterior  
portion.

23. The implant of claim 21 wherein the central body comprises a polymer.

20   24. The implant of claim 21 wherein each extension comprises a centrally located recess.

25. The implant of claim 24 wherein the recess has a length substantially similar to a  
height of the central body.

25   26. The implant of claim 24 wherein the extension further comprises an internal slot.

27. An interspinous implant for insertion into an interspinous space between a first  
and second spinous process, the implant comprising:

30           a) a central body having:  
i. an upper surface for bearing against an upper spinous process, and

ii. a lower surface for bearing against a lower spinous process,  
wherein the upper and lower surface define a sagittal profile comprising a substantially  
parallel anterior portion and an inwardly tapering posterior portion.

5 28. An interspinous implant for insertion into an interspinous space between a first and  
second spinous process, the implant comprising:

a) a central body having:

10 i. an upper surface for bearing against an upper spinous process,  
ii. a lower surface for bearing against a lower spinous process,  
iii. first and second side surfaces defining a transverse axis, and  
iv. a first opening extending from the first side surface into the body,

15 b) a first extension having an upper end, a lower end, an inner surface, the  
first extension being separate from the central body,

c) a second extension having an upper end, a lower end, an inner surface, the  
second extension being separate from the central body,

20 wherein the first side surface of the central body contacts the inner surface of the first  
extension,

wherein the second side surface of the central body contacts the inner surface of the  
second extension,

wherein the upper ends of the extensions collectively define an upper bracket, and

25 wherein the lower ends of the extensions collectively define a lower bracket.

29. The implant of claim 28 further comprising:

30 d) means for connecting the first side surface of the central body to the inner  
surface of the first extension.

30. The implant of claim 29 further comprising:

- 5                   e) means for connecting the second side surface of the central body to the inner surface of the second extension.

31. The implant of claim 29 wherein the means for connecting comprises first and second openings respectively extending into the central body from the first and second side surfaces.

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32. The implant of claim 31 wherein the first and second openings are connected to form a transverse throughhole.

15 33. The implant of claim 32 wherein each of the extension has a male pin extending from its inner surface, wherein the male pin is adapted to be received in the transverse throughhole.

20 35. The implant of claim 33 wherein each of the extensions has a male pin extending from its inner surface, wherein male pin the is adapted to be received in the transverse throughhole.

36. The implant of claim 33 wherein each of the extensions has a transverse throughhole extending from its inner surface to its outer surface.

25 37. The implant of claim 36 further comprising :

- e) a transverse connecting pin adapted to be received in each of the transverse throughholes of the central body and extensions.

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38. The implant of claim 28 wherein the extensions are spaced from each other a distance that is substantially greater than a width of the spinous process.

5 39. The implant of claim 28 wherein at least one extension has an inner surface having a convex contour.

40. The implant of claim 39 wherein the convex contour is adapted to match a contour of at least one of the spinous processes.

10 41. The implant of claim 28 wherein at least one extension has an anterior surface having a concave contour.

42. The implant of claim 41 wherein the concave contour is adapted to match a convex contour of an erector spinae portion of at least one of the spinous processes.

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43. The implant of claim 28 further comprising d) a rivet.

44. The implant of claim 43 wherein the rivet comprises:

20 i. a first connecting pin adapted to fit in the first transverse throughhole and having a male end, and

ii. a second connecting pin adapted to fit in the second transverse throughhole and having a female end.

25 45. The implant of claim 43 wherein a first portion of the rivet is integral with one of the extensions.

46. The implant of claim 45 wherein a second portion of the rivet is integral with the other of the extensions.

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47. The implant of claim 43 wherein the rivet is located about in a center of one of the extensions.

5 48. The implant of claim 43 wherein the rivet is located about in a bottom half of one of the extensions.

49. The implant of claim 28 wherein the central body is made of a material having a first stiffness and the extensions are made of a material having a second stiffness, wherein the first stiffness is lower than the second stiffness.

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50. A method of implanting an interspinous implant between adjacent spinous process defining an interspinous space having first and second sides, comprising the steps of:

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a) providing a central body having first and second side surfaces,

b) inserting the central body laterally into the interspinous space so that the first side surface is disposed on the first side of the interspinous space and the second side surface is disposed on the second side of the interspinous space,

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c) providing a first extension having an upper end, a lower end, and an inner surface, and

d) riveting the inner surface of the first extension to the first side surface of the central body.

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51. An interspinous implant for insertion into an interspinous space between a first and second spinous process, the implant comprising:

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a) an upper hook having a leading end, a trailing end, an upper bearing surface adapted to bear against the first spinous process, and a lower surface,



b) a lower hook having a leading end, a trailing end, and a lower bearing surface adapted to bear against the first spinous process, and an upper surface,

c) a central body having:

- 5                   i. an upper surface adapted for connection to the lower surface of the upper hook, and  
                  ii. a lower surface adapted for connection to the upper surface of the lower hook.

10   52. The implant of claim 51 wherein the leading and trailing ends of the upper hook extend in substantially a first same direction.

53. The implant of claim 52 wherein the leading and trailing ends of the lower hook extend in substantially a second same direction.

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54. The implant of claim 54 wherein the upper surface of the central body is adapted for connection to the lower surface of the upper hook by a male-female connection.

20   55. The implant of claim 54 wherein the upper surface of the central body is adapted for connection to the lower surface of the upper hook by a dovetail connection.

56. The implant of claim 54 wherein the upper surface of the central body has a female recess traversing the upper surface in a direction from the leading end to the trailing end.

25   57. The implant of claim 54 wherein the upper surface of the central body has a projection recess traversing the upper surface in a direction from the leading end to the trailing end.

30   58. The implant of claim 54 wherein the upper surface of the central body has a dovetail feature traversing the upper surface in a direction from the leading end to the trailing end.